

# Mohammad Sadra Heydari

MRes student in Economics @ Adam Smith Business School (University of Glasgow)

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## Education

### MRes in Economics

📅 Sep 2023 – Present

🏛️ University of Glasgow — Adam Smith Business School

### B.Sc. in Computer Engineering

📅 Sep 2018 – Jun 2023

🏛️ Sharif University of Technology - Department of Computer Engineering

GPA: 17.01/20.0

**Thesis:** *Assessing the effect of supervised dimensional reduction algorithms on clustering big socio-economic data*

### Minor in Economics

📅 Sep 2018 – Jun 2023

🏛️ Sharif University of Technology — Graduate School of Management and Economics

GPA: 18.9/20.0

## Publications

### Absolute Intragenerational Mobility in Iran (2023)

🔗 [\[Link\]](#)

Amanzadeh, N. and Heydari, M.S. *The Quarterly Review of Economics and Finance.*

## Research Experience

### Expenditure Mobility and Household Income Dynamics in Iran

Supervisor: Dr. Naser Amanzadeh

- Surveyed literature on inter and intra-generational mobility in developing countries.
- Processed raw data from the Household Income and Expenditure Survey (HEIS), encompassing micro-level data from nearly 20k households annually over 40 years, and analyzed Intragenerational Mobility using available panel data for the 2010s.
- Proposed an approximation method employing various Copula distributions, and estimated mobility rates ranging from 40% to 65% for the years 1991 to 2019.

### Supervised Dimensional Reduction on Socio-Economic Datasets

Supervisor: Dr. M. Amin Fazli

- Employed supervised dimension reduction algorithms (St-SNE) using decile ranking, devised similarity metrics, utilizing demographic, geographic, and financial features to create a synthetic dataset via t-SNE, and compared the performance of clustering algorithms on these datasets.

## Honors and Awards

|      |                                    |   |                |
|------|------------------------------------|---|----------------|
| 2023 | <b>Economics Scholarship (2+3)</b> | Adam Smith Business School; University of Glasgow                         | Glasgow, UK    |
| 2021 | <b>Best Paper</b>                  | Fourth Iran Economic Forum; Tehran Institute for Advanced Studies (TeIAS) | Tehran, Iran   |
| 2018 | <b>Silver Medal</b>                | 12th International Olympiad on Astronomy & Astrophysics (IOAA)            | Beijing, China |
| 2017 | <b>Gold Medal</b>                  | 13th National Astronomy & Astrophysics Olympiad                           | Tehran, Iran   |

## Skills

**Programming Languages:** Python (*advanced*), R (*advanced*), Java (*advanced*), C / C++ (*modest*), SQL (*modest*), Julia (*basic*), MatLab & Octave (*basic*), Stata (*basic*), VHDL / Verilog (*basic*), C# (*basic*), HTML/JS (*basic*)

**Tools and Software:** MS Excel (*advanced*), Jupyter NB / G Colab (*advanced*), L<sup>A</sup>T<sub>E</sub>X (*advanced*), Git / GitHub (*modest*), Dynare (*modest*), Gephi (*modest*), Vensim (*modest*), Twitter & Telegram API (*modest*), CrowdTangle (*basic*), ModelSim (*basic*)

**Language:** Farsi/Persian (*native*), English (*fluent* - IELTS: 8.0)

## Selected Courses

🏛️ **Sharif University of Technology:** Econometrics (19.6/20), Macroeconomics (19.9/20), Game Theory (20.0/20), Industrial Organization (17.3/20), Advanced Programming (19.3/20), Probability & Statistics (20.0/20), Linear Algebra (16.7/20), Artificial Intelligence (19.9/20), Machine Learning (16.5/20), Computer Simulation (19.7/20)

🏛️ **Adam Smith Business School:** Econometrics I (*TBD*), Econometrics II (*TBD*), Macroeconomics (*TBD*), Microeconomics (*TBD*), Mathematical Methods in Economics (*TBD*)

🏛️ **Audited and Online Courses:** Using Big Data to Solve Social and Economic Problems (*Harvard*), Natural Language Processing with Deep Learning (*Stanford*), Macroeconomics I, II (*Sharif*), Microeconomics I (*Sharif*)

## Work Experience

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### Junior Data Scientist | *Metodata*

Jan 2022 - Sep 2022

Collaborated under the supervision of *Dr. Meysam Alizadeh* and *Dr. Zeynab Samei*.

- Household transaction pattern analysis and anomaly detection
  - . Collaborated on a project with the Central Bank of Iran and the Ministry of Welfare.
  - . Analyzed 100 million transactions from a 100,000-sample of Iranian households.
  - . Utilized Info-map and Leiden community detection algorithms for identifying irregular transaction patterns.
  - . Engineered a model achieving 84% accuracy in detecting irregularities based on macro socio-economic features from the Iranian Welfare database.
- Social media analysis
  - . Conducted data collection on prominent Iranian social media platforms based on client-specified keywords.
  - . Employed LDA-Topic modeling to uncover key themes within the collected data.
  - . Utilized a semantic analysis model to gauge public reactions and satisfaction.
  - . Applied graph analysis to pinpoint influential users and identify communication clusters.
- Hotel demand prediction for a private booking company
  - . Analyzed user activities and reservation data for monthly demand prediction.
  - . Constructed a comprehensive dataset, including economic, social, and political factors.
  - . Developed a time-series forecasting model for provincial accommodation requests.

### Data Engineer Intern | *Institute for Research in Fundamental Sciences (IPM)*

Jun 2020 - Sep 2020

Contributed to the R&D team of Iran's National Observatory (INO) project.

- Weather station data pipe-line and data analysis
  - . Established a data-cleaning pipeline for the weather report system, handling sensor data reception, filtering, storage, and real-time visualization of station status.
  - . Developed a model to detect clouds in night sky images captured by the all-sky camera deployed at the station.

## Selected Projects

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### Regression with Many Predictors | *MRes Econometrics Project*

[🔗 \[Link\]](#)

- Constructed diverse data-generating processes with multicollinearity and autoregression features.
- Applied Information Theoretic Model Averaging (ITMA), PCA regression, and Lasso regression to assess their performance.
- Evaluated bias in coefficient estimation and the ability to eliminate irrelevant covariates.
- Concluded ITMA's superior performance, especially in eliminating irrelevant variables, particularly with low error variance.

### Intergenerational Income Mobility for Iran 1984-1990 | *B.Sc. Econometrics Project*

[🔗 \[Link\]](#)

- Utilized marginal distributions of income per capita from the Iranian Expenditure and Income Survey (HEIS) since 1984.
- Constructed a pseudo-panel incorporating geographical and demographic features of the households.
- Evaluated the percentage of children with higher income than their parents, focusing on those born between 1984 and 1990.

### Effect of Class Size on Student's Exam Results | *B.Sc. Econometrics Project*

[🔗 \[Link\]](#)

- Inspired by the second empirical project from the online course "*Using Big Data to Solve Social and Economic Problems*," instructed by *Chetty, R.* in 2019 at Harvard University.
- Utilized the regression discontinuity design (RDD) to assess the impact of class size on fifth-grade students' performance in math and literature exams, using the data from Israel's schools in 1992.

## Other Experiences

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### Teaching Assistant 🏛️ Sharif University of Technology

Sep 2019 - Jul 2022

- *Probability & Statistics*: Fall 2020, Spring 2021
- *Introduction to Macroeconomics*: Spring 2021
- *Data Structure & Algorithm*: Spring 2021
- *Game Theory*: Fall 2021, Spring 21

## References

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### Dr. Naser Amanzadeh

Post-doctoral researcher at University of California, Berkeley

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### Dr. Meysam Alizadeh

Post-doctoral researcher at University of Zurich

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### Dr. Mohammad Hossein Rahmati

Associate Professor at Sharif University of Technology

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